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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/591,338	08/02/2007	Ian H. Ratcliff	K0050.0002/P002	9507
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DICKSTEIN SHAPIRO LLP			TRAN, DIEM T	
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/591,338	<b>Applicant(s)</b> RATCLIFF ET AL.	
	<b>Examiner</b> DIEM TRAN	<b>Art Unit</b> 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6,9-11 and 13-36 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6,9-11 and 13-36 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

### **DETAILED ACTION**

This office action is in response to the Request for Continued Examination filed on 12/18/09. In this amendment, claims 1, 11, 13, 14, 16-18, 29, 31-34 have been amended, claims 7, 8, 12 have been canceled and claims 35, 36 have been added. Overall, claims 1-6, 9-11, 13-36 are pending in this application.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

***Claims 1-3, 5-6, 13, 14, 16-18, 25, 27-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al. (US 6,810,661) and Kagenishi (US Patent 7,000,384).***

Regarding claims 1, 13, 14, 16-18, 25, 27-34, Kamihara discloses a method of controlling an exhaust filter regeneration regime comprising:

injecting fuel into an exhaust stream and thereby increasing an exhaust stream temperature, said increasing exhaust stream temperature being in conjunction with a catalytic treatment element; and of metering fuel injection dependent upon the exhaust stream temperature (see Figure 1, col. 2, lines 26-50, col. 3, lines 23-29); however, fails to disclose pre-heating fuel to be injected with vehicle waste heat, wherein the vehicle waste heat is not from the exhaust stream, and recording a regeneration regime history and modifying the regeneration regime

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based on the recorded history. Lambert teaches pre-heating fuel to be injected into the exhaust gas with vehicle waste heat, wherein the vehicle waste heat is not from the exhaust stream (see Figure 1, col. 4, lines 25-45). Kagenishi teaches recording a regeneration regime history and modifying the regeneration regime based on the recorded history (see col. 5, lines 42-55).

It would have been obvious to one having ordinary skill in the art, to have utilized the teachings of Lambert and Kagenishi in the system of Kamihara, since the use thereof would have made use of the vehicle waste heat to heat fuel before injecting into the exhaust gas to improve the efficiency of the filter regeneration.

Regarding claim 2, Kamihara further discloses that the fuel injecting is metered by controlling amount of fuel injected (see col. 2, lines 46-50).

Regarding claim 3, Kamihara further discloses that the exhaust stream temperature comprises the temperature (8') of the exhaust stream at an outlet of the catalytic treatment element (4) (see Figure 1).

Regarding claim 5, Kamihara further discloses initiating fuel injection into the exhaust stream when a filter load exceeds an initiation value (see col. 3, lines 53-59).

Regarding claim 6, Kamihara further discloses that the fuel injection is terminated upon a regeneration regime period exceeding a time threshold (see col. 5, lines 61-68).

Regarding claims 35, 36, Lambert further teaches the means for pre-heating fuel comprises an engine-heated fluid chamber (see Figure 1, col. 4, lines 25-45).

***Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al. and Kagenishi as applied to claim 3 above, and further in view of Sato et al. (US Patent 4,535,588).***

The modified Kamihara method discloses all the claimed limitations as discussed in claim 3 above; however, fails to disclose that the fuel injection is metered dependent upon the temperature of exhaust gas exiting an engine and the temperature at an inlet of the catalytic treatment element. Sato teaches that the fuel injection is metered dependent upon the temperature of exhaust gas exiting an engine and at an inlet of a catalytic treatment element (see Figure 5).

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Sato in the modified method of Kamihara, since the use thereof would have improved the efficiency of the filter regeneration.

***Claims 9, 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al. and Kagenishi (US Patent 7,000,384) as applied to claim 1 above, and further in view of Hofmann et al. (US Patent 5,884,475).***

Regarding claim 9, the modified Kamihara method discloses all the claimed limitations as discussed in claim 1 above; however, fails to disclose that fuel is mixed with compressed air in an injection head prior to injection into an exhaust stream. Hofmann teaches that reducing agent is mixed with compressed air (29) in an injection head (24) prior to injection into an exhaust stream (see Figure 3); wherein the air provides a pressure needed to inject the reducing agent.

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Hofmann in the modified method of Kamihara, since the use thereof would have been conventional in the art to inject the reducing agent into the exhaust gas system to purify the harmful emissions.

Regarding claim 10, since Hofmann teaches that the reducing agent which is still contained between the back flush valve and the nozzle is blown out into the exhaust gas line (42) through the use of pressurized air (29) (see Figure 4, col. 7, lines 55-58), it would have been obvious for one having ordinary skill in the art to realize that Hofmann teaches supplying compressed air into said nozzle for a predetermined period of time after supplying of fuel to the nozzle is terminated.

***Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US Patent 4,492,079) in view of Kamihara (US Patent 5,193,340), Lambert et al. (US Patent 6,810,661) and Kagenishi (US Patent 7,000,384).***

Regarding claim 11, Takagi discloses a method of triggering an exhaust filter regeneration regime comprising obtaining a value of filter load as function of a filter pressure and an exhaust mass flow and triggering a regeneration regime when the filter load exceeds a predetermined value (see abstract); however, fails to disclose initiating fuel injection into an exhaust stream upon the triggering the exhaust filter regeneration regime, pre-heating fuel to be injected with vehicle waste heat, recording a regeneration regime history and modifying the regeneration regime based on the recorded history. Kamihara teaches initiating fuel injection into an exhaust stream upon the triggering the exhaust filter regeneration regime (see Figure 1,

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col. 2, lines 26-50, col. 3, lines 23-29). Lambert teaches pre-heating fuel to be injected into the exhaust gas with vehicle waste heat (see Figure 1, col. 4, lines 25-45) and Kagenishi teaches recording a regeneration regime history and modifying the regeneration regime based on the recorded history (see col. 5, lines 42-55).

It would have been obvious to one having ordinary skill in the art, to have utilized the teachings of Kamihara, Lambert and Kagenishi in the system of Takagi, since the use thereof would have made use of the vehicle waste heat to heat fuel before injecting into the exhaust gas to improve the efficiency of the filter regeneration.

***Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al. and Kagenishi as applied to claim 14 above, and further in view of Takagi et al. (US Patent 4,492,079).***

The modified Kamihara method discloses all the claimed limitations as discussed in claim 14 above; however, fails to disclose obtaining a value of a filter load as a function of a filter pressure and an exhaust mass flow and triggering the regeneration regime when the filter load exceeds a predetermined value. Takagi teaches obtaining a value of a filter load as a function of a filter pressure and an exhaust mass flow and triggering the regeneration regime when the filter load exceeds a predetermined value (see abstract).

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Takagi in the modified method of Kamihara, since the use thereof would have provided an accurate means to determine the amount of particulate matter in the filter device.

***Claims 19, 20, 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al. and Kagenishi as applied to claim 18 above, and further in view of Tost (US Patent 6,192,677).***

Regarding claims 19, 20, the modified Kamihara method discloses all the claimed limitations as discussed in claim 18 above; however, fails to disclose that the fuel injector includes a fuel input channel and an air input channel, each said channel having an output end, whereby the output ends of the air and fuel channels are provided adjacent one another at a fuel injection output. Tost teaches that a fuel injector includes a fuel input channel and an air input channel, each said channel having an output end, whereby the output ends of the air and fuel channels are provided adjacent one another at a fuel injection output (see Figure 1); wherein the air provides a pressure needed to inject the reducing agent.

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Tost in the modified method of Kamihara, since the use thereof would have been conventional in the art to inject the reducing agent into the exhaust gas system.

Regarding claim 22, the modified Kamihara method discloses all the claimed limitations as discussed in claim 20 above; however, fails to disclose that said compressor is arranged to operate in the pressure range of 2 to 200 bar.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide specific optimum range of the pressure of a compressor being 2 to 200 bar, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.



***Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al., Kagenishi and Tost as applied to claim 20 above, and further in view of Ingalls, Jr et al. (US Patent 7,140,874).***

The modified Kamihara system discloses all the claimed limitations as discussed in claim 20 above; however, fails to disclose said fuel pump is a peristaltic pump. Ingalls, Jr. teaches that a peristaltic pump is used to inject oil into the exhaust gas system (see col. 11, lines 56-61).

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Ingalls, Jr. in the modified system of Kamihara, since the use thereof would have provided an effective means to inject oil into the exhaust gas system.

***Claims 23, 24, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamihara (US Patent 5,193,340) in view of Lambert et al. and Kagenishi as applied to claim 17 above, and further in view of Takeshima et al. (US Patent 5,388,406).***

Regarding claims 23, 24, Kamihara discloses all the claimed limitations as discussed in claim 17 above; however, fails to disclose an electrical heater located before upstream of an exhaust gas input face of the catalytic treatment element relative to an exhaust steam flow. Takeshima teaches an electrical heater (84) located before upstream of an exhaust gas input face of the catalytic treatment element relative to an exhaust stream flow (see Figure 8).

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Takeshima in the modified system of Kamihara, since the use thereof would have provided an effective means to heat up the catalyst device.

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Regarding claim 26, the modified Kamihara system discloses all the claimed limitations as discussed in claim 17 above; however, fails to disclose an exhaust filter component and a sensor extending radially therein. Takeshima teaches an exhaust filter component and a sensor extending radially therein (see Figure 8).

It would have been obvious to one having ordinary skill in the art, to have utilized the teaching of Takeshima in the modified system of Kamihara, since the use thereof would have been conventional in the art to accurately measure the filter temperature.

### ***Conclusion***

Any inquiry concerning this communication from the examiner should be directed to Examiner Diem Tran whose telephone number is (571) 272-4866. The examiner can normally be reached on Monday -Friday from 8:00 a.m.- 5:30p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reached on (571) 272-4859. The fax number for this group is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 800-786-9199 (toll-free).

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/Diem Tran/

Patent Examiner

/Thomas E. Denion/

Supervisory Patent Examiner, Art Unit 3748